Remarks

By this Amendment, the applicants have amended the specification to correct an obvious typographical error that appeared on page 5. The applicants have also amended the Brief Description of the Sequences section to list the AmEPV open reading frames associated with SEQ ID NOs. 1-22 and added SEQ ID NOs. 28-74. The applicants have also amended the Sequence Listing to include SEQ ID NOs. 28-74. Support for these amendments can be found within Tables 1-3 and SEQ ID NOs. 23-27 of the subject specification. In order to lend greater clarity to the claimed subject matter, the applicants have also made various amendments to the claims. Support for these amendments can be found throughout the subject specification and the claims as originally filed. No new matter is being added by this Amendment.

The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16 or 1.17 as required by this paper to Deposit Account No. 19-0065.

The applicant invites the Examiner to call the undersigned if clarification is needed on any of this Amendment, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

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GPL/jaj
Attached: Marked-up Version of Amended Specification
Marked-up Version of Amended Claims
Submission of Sequence Listing and Statement under 37 C.F.R. §§1.821-1.825
Sequence Listing on paper and computer readable format

Marked-up Version of Amended Specification

Page 5, line 23 through Page 6, line 3 (amended):

The subject invention concerns a novel viral vector system for gene therapy based on an insect poxvirus designed to deliver genes for integration and stable, permanent expression in vertebrate cells. In an exemplified embodiment, a recombinant AmEPV vector was constructed that contains heterologous genes under the control of promoters that ~~the~~ drive the expression of the heterologous genes in vertebrate cells. The *gfp* gene and the gene encoding G418 resistance were used in an exemplified construct. The recombinant AmEPV was used to infect vertebrate cells and following infection the cells were transferred to media containing G418. Cells expressing both GFP and G418 resistance were obtained. Thus, the vectors of the subject invention can be used to deliver large DNA segments for the engineering of vertebrate cells.

Page 10, line 1 through Page 11, line 14 (amended):

Brief Description of the Sequences

SEQ ID NO: 1 is the nucleotide sequence of the gene encoding AmEPV triacylglyceride lipase (AMV133).

SEQ ID NO: 2 is the nucleotide sequence of the gene encoding AmEPV Cu^{++}/Zn^{++} superoxide dismutase (SOD) (AMV255).

SEQ ID NO: 3 is the nucleotide sequence of the gene encoding AmEPV CPD photolyase (AMV025).

SEQ ID NO: 4 is the nucleotide sequence of the gene encoding AmEPV baculovirus-like inhibitor of apoptosis (IAP) (AMV021).

SEQ ID NO: 5 is the nucleotide sequence of the gene encoding a first AmEPV poly(A) polymerase small subunit (AMV060).

SEQ ID NO: 6 is the nucleotide sequence of the gene encoding a second AmEPV poly(A) polymerase small subunit (AMV115).

SEQ ID NO: 7 is the nucleotide sequence of the gene encoding a first AmEPV DNA polymerase (AMV050).

SEQ ID NO: 8 is the nucleotide sequence of the gene encoding a second AmEPV DNA polymerase (AMV210).

SEQ ID NO: 9 is the nucleotide sequence of the gene encoding AmEPV ABC transporter-like protein (AMV130).

SEQ ID NO: 10 is the nucleotide sequence of the gene encoding AmEPV Kunitz-motif inhibitor (KPI) (AMV007).

SEQ ID NO: 11 is the nucleotide sequence of the gene encoding AmEPV poly(A) polymerase large subunit (AMV038).

SEQ ID NO: 12 is the amino acid sequence for the AmEPV triacylglyceride lipase (AMV133).

SEQ ID NO: 13 is the amino acid sequence for the AmEPV Cu^{++}/Zn^{++} superoxide dismutase (SOD) (AMV255).

SEQ ID NO: 14 is the amino acid sequence for the AmEPV CPD photolyase (AMV025).

SEQ ID NO: 15 is the amino acid sequence for the AmEPV baculovirus-like inhibitor of apoptosis (IAP) (AMV021).

SEQ ID NO: 16 is the amino acid sequence for the first AmEPV poly(A) polymerase small subunit (AMV060).

SEQ ID NO: 17 is the amino acid sequence for the second AmEPV poly(A) polymerase small subunit (AMV115).

SEQ ID NO: 18 is the amino acid sequence for the first AmEPV DNA polymerase (AMV050).

SEQ ID NO: 19 is the amino acid sequence for the second AmEPV DNA polymerase (AMV210).

SEQ ID NO: 20 is the amino acid sequence for the AmEPV ABC transporter-like protein (AMV130).

SEQ ID NO: 21 is the amino acid sequence for the AmEPV Kunitz-motif inhibitor (KPI) (AMV007).

SEQ ID NO: 22 is the amino acid sequence for the AmEPV poly(A) polymerase large subunit (AMV038).

SEQ ID NOS: 23-27 is the nucleotide sequence of the AmEPV genome.

SEQ ID NO: 28 is the nucleotide sequence and amino acid sequence for an AmEPV enhancin protein (AMVITR10).

SEQ ID NO: 29 is the nucleotide sequence and amino acid sequence for an AmEPV dUTPase (AMV002).

SEQ ID NO: 30 is the nucleotide sequence and amino acid sequence for an AmEPV very late transcription factor-2 (VLTF-2) (AMV047).

SEQ ID NO: 31 is the nucleotide sequence and amino acid sequence for a first AmEPV RNA polymerase (AMV051).

SEQ ID NO: 32 is the nucleotide sequence and amino acid sequence for a second AmEPV RNA polymerase (AMV054).

SEQ ID NO: 33 is the nucleotide sequence and amino acid sequence for an AmEPV DNA helicase (AMV059).

SEQ ID NO: 34 is the nucleotide sequence and amino acid sequence for an AmEPV 30K virion protein (AMV061).

SEQ ID NO: 35 is the nucleotide sequence and amino acid sequence for a third AmEPV RNA polymerase (AMV066).

SEQ ID NO: 36 is the nucleotide sequence and amino acid sequence for an AmEPV protein tyrosine phosphatase (AMV078).

SEQ ID NO: 37 is the nucleotide sequence and amino acid sequence for an AmEPV thioredoxin protein (AMV079).

SEQ ID NO: 38 is the nucleotide sequence and amino acid sequence for an AmEPV RNA helicase (AMV081).

SEQ ID NO: 39 is the nucleotide sequence and amino acid sequence for a first AmEPV serine/threonine protein kinase (AMV084).

SEQ ID NO: 40 is the nucleotide sequence and amino acid sequence for an AmEPV NTPase (AMV087).

SEQ ID NO: 41 is the nucleotide sequence and amino acid sequence for an AmEPV transcription factor (AMV091).

SEQ ID NO: 42 is the nucleotide sequence and amino acid sequence for an AmEPV mRNA capping small subunit (AMV093).

SEQ ID NO: 43 is the nucleotide sequence and amino acid sequence for an AmEPV very early transcription factor-large protein (VETF-L) (AMV105).

SEQ ID NO: 44 is the nucleotide sequence and amino acid sequence for an AmEPV redox protein (AMV114).

SEQ ID NO: 45 is the nucleotide sequence and amino acid sequence for an AmEPV rifampicin resistance protein (AMV122).

SEQ ID NO: 46 is the nucleotide sequence and amino acid sequence for an AmEPV mRNA capping large subunit (AMV135).

SEQ ID NO: 47 is the nucleotide sequence and amino acid sequence for an AmEPV P4a core protein (AMV139).

SEQ ID NO: 48 is the nucleotide sequence and amino acid sequence for an AmEPV P4b core protein (AMV147).

SEQ ID NO: 49 is the nucleotide sequence and amino acid sequence for an AmEPV ATP/GTP binding protein (AMV150).

SEQ ID NO: 50 is the nucleotide sequence and amino acid sequence for a second AmEPV serine threonine protein kinase (AMV153).

SEQ ID NO: 51 is the nucleotide sequence and amino acid sequence for a fourth AmEPV RNA polymerase (AMV166).

SEQ ID NO: 52 is the nucleotide sequence and amino acid sequence for an AmEPV polyubiquitin protein (AMV167).

SEQ ID NO: 53 is the nucleotide sequence and amino acid sequence for AmEPV very small transcription factor-short protein (VETF-s) (AMV174).

SEQ ID NO: 54 is the nucleotide sequence and amino acid sequence for AmEPV core protein (AMV181).

SEQ ID NO: 55 is the nucleotide sequence and amino acid sequence for an AmEPV nucleoside triphosphate phosphorylase I (NPH I) (AMV192).

SEQ ID NO: 56 is the nucleotide sequence and amino acid sequence for an AmEPV apoptosis-associated protein (AMV193).

SEQ ID NO: 57 is the nucleotide sequence and amino acid sequence for a third AmEPV serine/threonine protein kinase (AMV197).

SEQ ID NO: 58 is the nucleotide sequence and amino acid sequence for an AmEPV NAD+ dependent DNA ligase (AMV199).

SEQ ID NO: 59 is the nucleotide sequence and amino acid sequence for an AmEPV very late transcription factor-3 (VLTF-3) (AMV205).

SEQ ID NO: 60 is the nucleotide sequence and amino acid sequence for a fifth AmEPV RNA polymerase (AMV221).

SEQ ID NO: 61 is the nucleotide sequence and amino acid sequence for an AmEPV Ca^{2+} binding protein (AMV228).

SEQ ID NO: 62 is the nucleotide sequence and amino acid sequence for a sixth AmEPV RNA polymerase (AMV230).

SEQ ID NO: 63 is the nucleotide sequence and amino acid sequence for an AmEPV DNA glycosylase (AMV231).

SEQ ID NO: 64 is the nucleotide sequence and amino acid sequence for an AmEPV protein phosphatase (AMV234).

SEQ ID NO: 65 is the nucleotide sequence and amino acid sequence for an AmEPV phosphotyrosine kinase (AMV246).

SEQ ID NO: 66 is the nucleotide sequence and amino acid sequence for an AmEPV glycosyl transferase (AMV248).

SEQ ID NO: 67 is the nucleotide sequence and amino acid sequence for an AmEPV metalloprotease (AMV256).

SEQ ID NO: 68 is the nucleotide sequence and amino acid sequence for an AmEPV myristylated membrane protein (AMV217).

SEQ ID NO: 69 is the nucleotide sequence and amino acid sequence for an AmEPV NTP pyrophosphohydrolase (AMV058).

SEQ ID NO: 70 is the nucleotide sequence and amino acid sequence for an AmEPV DNA topoisomerase (AMV052).

SEQ ID NO: 71 is the nucleotide sequence and amino acid sequence for a first AmEPV membrane protein (AMV118).

SEQ ID NO: 72 is the nucleotide sequence and amino acid sequence for a second AmEPV membrane protein (AMV232).

SEQ ID NO: 73 is the nucleotide sequence and amino acid sequence for a third AmEPV membrane protein (AMV243).

SEQ ID NO: 74 is the nucleotide sequence and amino acid sequence for a fourth AmEPV membrane protein (AMV035).

Marked-up Version of Amended Claims

Claim 29 (amended):

The polynucleotide according to claim 28, wherein said triacylglyceride lipase comprises SEQ ID NO: 12 or a fragment ~~or variant~~ thereof.

Claim 30 (amended):

The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 1 or a fragment ~~or variant~~ thereof.

Claim 32 (amended):

The polynucleotide according to claim 28, wherein said Cu^{++}/Zn^{++} superoxide dismutase comprises SEQ ID NO: 13 or a fragment ~~or variant~~ thereof.

Claim 33 (amended):

The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 2 or a fragment ~~or variant~~ thereof.

Claim 35 (amended):

The polynucleotide according to claim 28, wherein said CPD photolyase comprises SEQ ID NO: 14 or a fragment ~~or variant~~ thereof.

Claim 36 (amended):

The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 3 or a fragment ~~or variant~~ thereof.

Claim 38 (amended):

The polynucleotide according to claim 28, wherein said baculovirus-like inhibitor of apoptosis comprises SEQ ID NO: 15 or a fragment ~~or variant~~ thereof.

Claim 39 (amended):

The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 4 or a fragment ~~or variant~~ thereof.

Claim 41 (amended):

The polynucleotide according to claim 28, wherein said first poly(A) polymerase small subunit comprises SEQ ID NO: 16 or a fragment ~~or variant~~ thereof.

Claim 42 (amended):

The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 5 or a fragment ~~or variant~~ thereof.

Claim 44 (amended):

The polynucleotide according to claim 28, wherein said second poly(A) polymerase small subunit comprises SEQ ID NO: 17 or a fragment ~~or variant~~ thereof.

Claim 45 (amended):

The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 6 or a fragment ~~or variant~~ thereof.

Claim 47 (amended):

The polynucleotide according to claim 28, wherein said first DNA polymerase comprises SEQ ID NO: 18 or a fragment ~~or variant~~ thereof.

Claim 48 (amended):

The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 7 or a fragment ~~or variant~~ thereof.

Claim 50 (amended):

The polynucleotide according to claim 28, wherein said second DNA polymerase comprises SEQ ID NO: 19 or a fragment ~~or variant~~ thereof.

Claim 51 (amended):

The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 8 or a fragment ~~or variant~~ thereof.

Claim 53 (amended):

The polynucleotide according to claim 28, wherein said ABC transporter-like protein comprises SEQ ID NO: 20 or a fragment ~~or variant~~ thereof.

Claim 54 (amended):

The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 9 or a fragment ~~or variant~~ thereof.

Claim 56 (amended):

The polynucleotide according to claim 28, wherein said Kunitz-motif protease inhibitor comprises SEQ ID NO: 21 or a fragment ~~or variant~~ thereof.

Claim 57 (amended):

The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 10 or a fragment ~~or variant~~ thereof.

Claim 59 (amended):

The polynucleotide according to claim 28, wherein said poly(A) polymerase large subunit comprises SEQ ID NO: 22 or a fragment ~~or variant~~ thereof.

Claim 60 (amended):

The polynucleotide according to claim 28, wherein said polynucleotide comprises SEQ ID NO: 11 or a fragment ~~or variant~~ thereof.

Claim 63 (amended):

The triacylglyceride lipase of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 12, or a fragment ~~or variant~~ thereof.

Claim 64 (amended):

The Cu^{++}/Zn^{++} superoxide disumutase of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 13, or a fragment ~~or variant~~ thereof.

Claim 65 (amended):

The CPD photolyase of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 14, or a fragment ~~or variant~~ thereof.

Claim 66 (amended):

The baculovirus-like inhibitor of apoptosis of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 15, or a fragment ~~or variant~~ thereof.

Claim 67 (amended):

The first poly(A) polymerase small subunit of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 16, or a fragment ~~or variant~~ thereof.

Claim 68 (amended):

The second poly(A) polymerase small subunit of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 17, or a fragment ~~or variant~~ thereof.

Claim 69 (amended):

The first DNA polymerase of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 18, or a fragment ~~or variant~~ thereof.

Claim 70 (amended):

The second DNA polymerase of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 19, or a fragment ~~or variant~~ thereof.

Claim 71 (amended):

The ABC transporter-like protein of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 20, or a fragment ~~or variant~~ thereof.

Claim 72 (amended):

The Kunitz-motif protease inhibitor of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 21, or a fragment ~~or variant~~ thereof.

Claim 73 (amended):

The poly(A) polymerase large subunit of claim 62 comprising the amino acid sequence as set forth in SEQ ID NO: 22, or a fragment ~~or variant~~ thereof.

Claim 74 (amended):

An isolated polynucleotide encoding an *Amsacta moorei* entomopox virus polypeptide, wherein said polynucleotide is selected from the group consisting of ~~AMVITR10, AMV002, AMV047, AMV051, AMV054, AMV059, AMV061, AMV066, AMV078, AMV079, AMV081,~~

~~AMV084, AMV087, AMV91, AMV093, AMV105, AMV114, AMV122, AMV135, AMV139, AMV147, AMV150, AMV153, AMV166, AMV167, AMV174, AMV181, AMV192, AMV193, AMV197, AMV199, AMV205, AMV221, AMV228, AMV230, AMV231, AMV234, AMV246, AMV248 and AMV256, or a fragment or variant thereof.~~ SEQ ID NO: 28, SEQ ID NO: 29, SEQ ID NO: 30, SEQ ID NO: 31, SEQ ID NO: 32, SEQ ID NO: 33, SEQ ID NO: 34, SEQ ID NO: 35, SEQ ID NO: 36, SEQ ID NO: 37, SEQ ID NO: 38, SEQ ID NO: 39, SEQ ID NO: 41, SEQ ID NO: 42, SEQ ID NO: 43, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 47, SEQ ID NO: 48, SEQ ID NO: 49, SEQ ID NO: 50, SEQ ID NO: 51, SEQ ID NO: 52, SEQ ID NO: 53, SEQ ID NO: 56, SEQ ID NO: 57, SEQ ID NO: 58, SEQ ID NO: 59, SEQ ID NO: 60, SEQ ID NO: 61, SEQ ID NO: 62, SEQ ID NO: 63, SEQ ID NO: 64, SEQ ID NO: 65, SEQ ID NO: 66, SEQ ID NO: 67, SEQ ID NO: 68, SEQ ID NO: 69, SEQ ID NO: 71, SEQ ID NO: 72, SEQ ID NO: 73, and SEQ ID NO: 74, or a fragment thereof.

Claim 75 (amended):

An isolated *Amsacta moorei* entomopox virus polypeptide encoded by a polynucleotide selected from the group consisting of ~~AMVITR10, AMV002, AMV047, AMV051, AMV054, AMV059, AMV061, AMV066, AMV078, AMV079, AMV081, AMV084, AMV087, AMV91, AMV093, AMV105, AMV114, AMV122, AMV135, AMV139, AMV147, AMV150, AMV153, AMV166, AMV167, AMV174, AMV181, AMV192, AMV193, AMV197, AMV199, AMV205, AMV221, AMV228, AMV230, AMV231, AMV234, AMV246, AMV248 and AMV256, or a fragment or variant thereof.~~ SEQ ID NO: 28, SEQ ID NO: 29, SEQ ID NO: 30, SEQ ID NO: 31, SEQ ID NO: 32, SEQ ID NO: 33, SEQ ID NO: 34, SEQ ID NO: 35, SEQ ID NO: 36, SEQ ID NO: 37, SEQ ID NO: 38, SEQ ID NO: 39, SEQ ID NO: 41, SEQ ID NO: 42, SEQ ID NO: 43, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 47, SEQ ID NO: 48, SEQ ID NO: 49, SEQ ID NO: 50, SEQ ID NO: 51, SEQ ID NO: 52, SEQ ID NO: 53, SEQ ID NO: 56, SEQ ID NO: 57, SEQ ID NO: 58, SEQ ID NO: 59, SEQ ID NO: 60, SEQ ID NO: 61, SEQ ID NO: 62, SEQ ID NO: 63, SEQ ID NO: 64, SEQ ID NO: 65, SEQ ID NO: 66, SEQ ID NO: 67, SEQ ID NO: 68, SEQ ID NO: 69, SEQ ID NO: 71, SEQ ID NO: 72, SEQ ID NO: 73, and SEQ ID NO: 74, or a fragment thereof.